Liftoff and Time Equivalent Duration Data Evaluation of Exploration Flight Test 1 Orion Multi-Purpose Crew Vehicle

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Abstract

The liftoff phase induces high acoustic loading over a broad frequency range for a launch vehicle. These external acoustic environments are used in the prediction of the internal vibration responses of the vehicle and components. There arises the question about time equivalent (Teq) duration of the liftoff phase and similarity to other launch vehicles. Vibroacoustic engineers require the fatigue-weighted time duration values for qualification testing inputs. In order to determine the Teq for the Space Launch System, NASA's newest launch vehicle, the external microphone data from the Exploration Flight Test 1 (EFT-1) flight of the Orion Multi-Purpose Crew Vehicle (MPCV) was evaluated. During that evaluation, a trend was observed in the data and the origin of that trend is discussed in this paper. Finally, the Teq values for the EFT-1 Orion MPCV are presented.

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